Evaluation of Different Strategies to Control Alfalfa Potato Leafhopper Populations in Quebec

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In eastern Canada, since 2017, the potato leafhopper [PLH, *Empoasca fabae* (Harris)], which affects alfalfa (*Medicago sativa* L.), has become a recurring problem due to climate warming affecting its migration. The objective of this study was to evaluate strategies in order to reduce yield losses caused by this pest. Therefore, an experiment was conducted at three sites in Quebec over three years to evaluate the impact of insecticide applications and the use of PLH-tolerant cultivars on forage yield and PLH populations. A total of seven cultivars (five tolerant: FSG421LH, P55H94, Safeguard PLH, SW315LH, WL358LH; and two susceptible: Eclipse and Dominator) were seeded and for each cultivar, a control (no treatment) and an insecticide treatment (cyhalothrin-lambda - 83 mL/ha) was done when the PLH population reached the locally recommended threshold.

Foliar insecticide applications in the seeding year reduced PLH populations but generally failed to impact alfalfa yields compared to untreated alfalfa. However, at one site, applications made in the seeding year resulted in an increase in alfalfa yield of 7% at the first cut in the post-seeding year compared to untreated alfalfa. Differences in PLH population levels between PLH-tolerant and PLH-susceptible cultivars were not significant in the seeding and post-seeding years regardless of the PLH infestation level. In the seeding year, yield differences were observed between cultivars at one site, some tolerant cultivars having comparable or higher yields than susceptible control cultivars.

However, in the first two post-seeding years, variable results were observed. In some environments specific PLH-tolerant varieties produced higher yields than susceptible control cultivars, but the opposite was also observed.

Results suggest that the use of insecticide is a more effective way to reduce PLH populations than PLH-tolerant cultivars. However, the application of insecticide had generally no effect on alfalfa yield, whereas the utilisation of PLH-tolerant cultivars had variable effects. Therefore, more data are needed to determine the impact of these management tools on alfalfa yields as PLH populations we observed in post-seeding years were generally low.